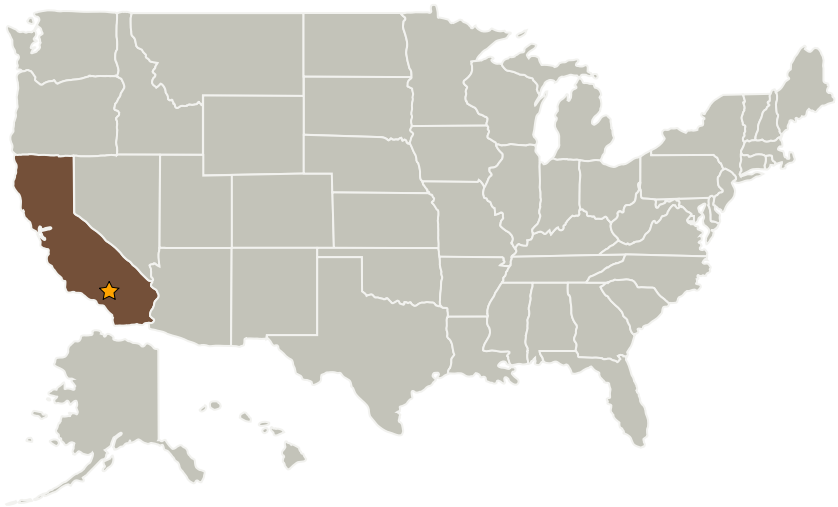
Innovative Self-Powered and Self-Contained Sensor Array for Separation Detection, Phase II

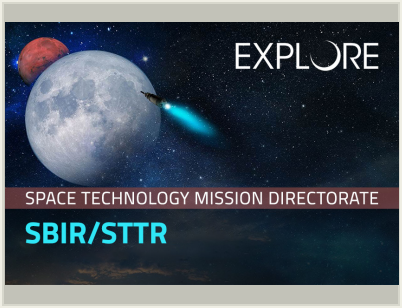
Completed Technology Project (2009 - 2011)

Project Introduction

The proposed innovation is a self-contained, self-powered, robust flight test sensor array for the determination of separation. The proposed system uses off-the-shelf, currently available technology to create a reusable distributed sensor array, which requires no external wiring or power source. The system is based on tufts attached to individual bimorph piezoelectric sensors. A distributed array of bimorph tuft sensors is embedded in a flexible, self-adhesive backed sheet of polymide substrate. The proposed separation sensor array will provide real-time, accurate determination of separation across a wide range of flight conditions. The self-contained blanket array can be quickly and easily applied to aircraft surfaces in question. No wiring, external power, or remote viewing is required for acquisition. After testing is complete, the system can be quickly removed and reused. Additionally, the system could be miniaturized for use in ground test facilities or other types of vehicles. The bimorph tuft based separation sensor array promises to provide a realizable, accurate, efficient, and cost effective measurement system. Results produced during the Phase I program have shown that the concept of a piezoelectric tuft sensor is a viable and robust technology, able to provide a reliable and cost effective separation detection system across an incredibly wide range of both flight and ground test conditions.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Rolling Hills Research Corporation	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations
California

Project Transitions

December 2009: Project Start

May 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.6 Innovative Antennas